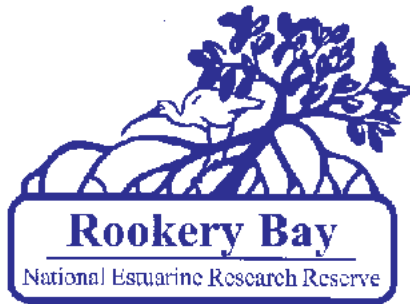


*Characterization of the
Rookery Bay
National Estuarine Research Reserve*



This CD-ROM characterizes the culture, ecology and resources in the reserve, the surrounding state managed aquatic preserve and their watersheds. The information presented is particularly useful for resource managers and researchers, but just about anyone interested in estuary or watershed management will find something of interest.



Acknowledgements

A project of this magnitude cannot ever be completed by one or two people alone, at least not in a reasonable length of time. We would like to acknowledge all the people, past and present, whose efforts, research, photography and documentation provided the backbone for this CD. The list of supporters is extensive, and, consequently, we will list, in alphabetical order, only those whose work is directly transcribed on these pages. We are especially grateful for the assistance provided by the staff and contract personnel of NOAA's Coastal Services Center and the administrative support provided by Florida Department of Environmental Protection's Office of Coastal and Aquatic Managed Areas.

Beverly Anderson

Summary of bird studies and research needs for bird populations

Tad Bartareau

Fire and multispecies resource management summaries

Judy Haner

Resource management appendices from the management plan

Gary Lytton

Reserve history and background information

Vicki McGee

Summary of water quality data

Pat O'Donnell

Summary of fish research in the bays of the Southern Golden Gates Estates

Nancy Olson

Summary of history and preservation

Jill Schmid:

Assistance with GIS coverages

GIS Metadata for all files

Turtle research synopsis

Amanda Stein

Compiling databases for RBNERR's research documents and species lists, and providing the majority of beautiful photographs featured on this CD

Heather Stoffel

Water quality database management



Rookery Bay

National Estuarine Research Reserve

Rookery Bay NERR

[General Information](#) | [History](#) | [Socio-Economics](#) | [2003 Boundary Expansion](#)



ookery Bay



The Rookery Bay and Ten Thousand Islands ecosystem is a prime example of a nearly pristine subtropical mangrove forested estuary. Rookery Bay National Estuarine Research Reserve (RBNERR) is located in the West Florida subregion of the West Indian Biogeographic Region . The total estimated surface area of open waters encompassed within proposed boundaries is 70,000 acres, 64 percent of RBNERR. The remaining 40,000 acres are composed primarily of mangroves, fresh to brackish water marshes, and upland habitats. Rookery Bay has a surface area of 1,034 acres and a mean depth of about 1 m. Salinities range from 18.5 to 39.4 parts per thousand with lower values occurring during the wet season from May through October. Highest values occur during the dry seasons (winter and spring) and can exceed those of the open Gulf of Mexico (35-36 parts per thousand).

Approximately 3,772 acres within the RBNERR boundaries are leased to the Department of Environmental Protection (DEP) by NAS, The Nature Conservancy, and CSF. State-owned lands, including 70,000 acres of submerged lands and approximately 22,928 acres of acquired lands, are held in fee simple title by the Board of Trustees. Approximately 13,300 additional acres within the boundaries were acquired by the state as part of a settlement agreement with the Deltona Corporation. Parcels totaling approximately 500 acres represent privately-owned inholdings within RBNERR. DEP has designated all tidally connected waters within the boundaries of RBNERR and Cape Romano/Ten Thousand Islands Aquatic Preserves as Class II and Outstanding Florida Waters (OFW). OFW designation implements the state's highest standards for proposed developments, and does not allow for direct discharges that would lower ambient water quality, or indirect discharges that would significantly degrade water quality.

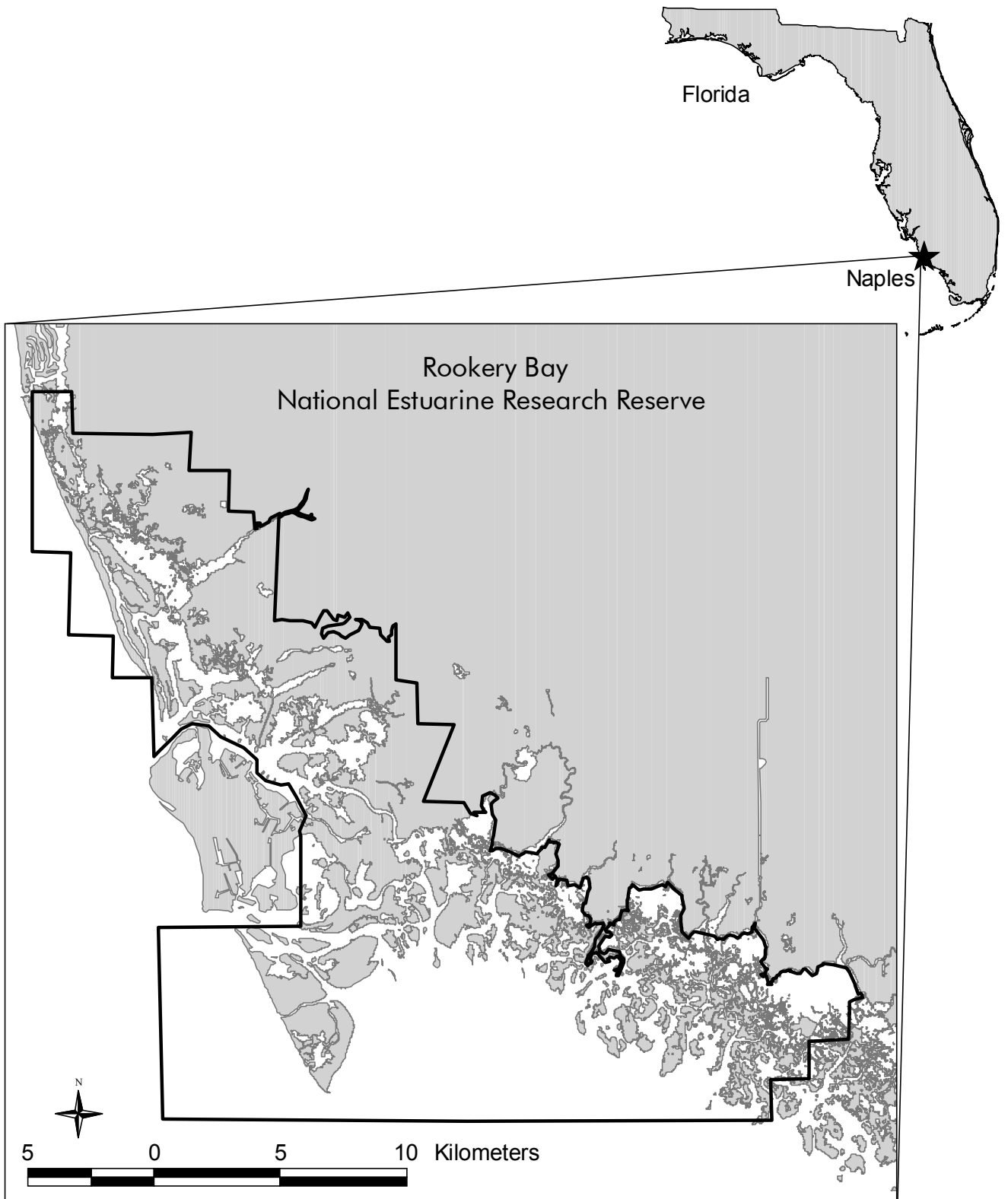


General Information

Rookery Bay National Estuarine Research Reserve (RBNERR) is located about 15 miles south of downtown Naples, Florida in Collier County. RBNERR is managed through the Florida Department of Environmental Protection (FDEP) and the National Oceanic and Atmospheric Administration (NOAA). FDEP staff at RBNERR also manage the Cape Romano-Ten Thousand Islands Aquatic Preserve, which extends from Cape Romano on the Gulf of Mexico, through the Ten Thousand Islands, to the Everglades National Park boundaries. Some management responsibility is shared with the U.S. Fish and Wildlife Service (USFWS) in the Ten Thousand Islands Wildlife Refuge.

The original headquarters and current lab facilities are located on Shell Island Road, off State Road 951 and about halfway between US Hwy 41 and Marco Island. A dock with slips for 15 boats extends into Henderson Creek a short distance from the opening into Rookery Bay and Hall Bay. RBNERR headquarters is now located on Tower Road on Henderson Creek upstream from the Shell Island facilities. The future Environmental Learning Center will be located on Tower Road with a bridge across Henderson Creek. RBNERR has two dormitory facilities for visiting researchers, educators, and resource managers - four beds in a restored gatekeeper's house on Goodland Bay and 12 beds at the lodge on Cannon Island.





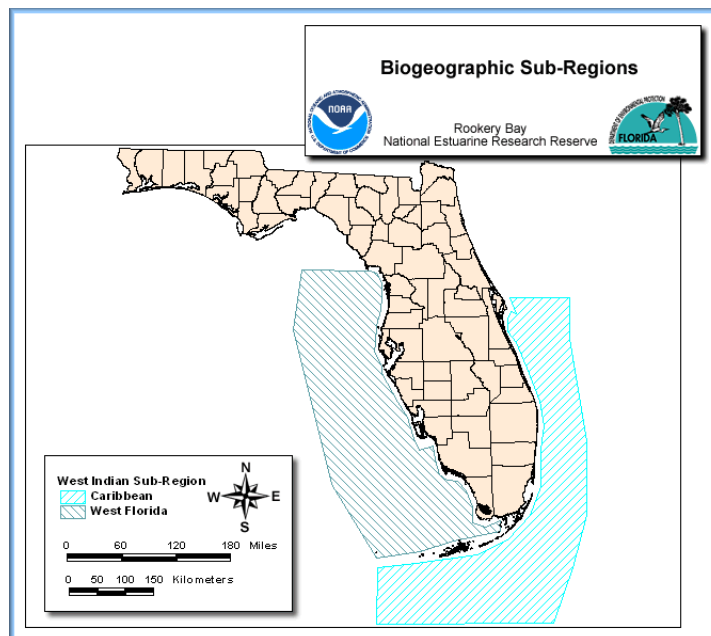
Map Produced By RBNERR
FDEP 2002
For Illustrative Purposes Only

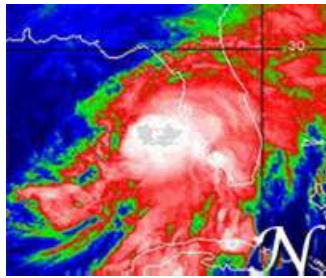


Climate

Rookery Bay is located in the Tropical Rainy climatic group of Koppen (1931), i.e. the area below a west-east line extending from Ft. Myers to Melbourne, and where the mean temperature does not fall below 17.7°C (64°F) in the coolest month of the year. Due to the influence of the warm-water Florida Current, the seasonal effects of the Gulf of Mexico Loop Current, and its geographical position at 26° N latitude, the average annual temperature in the Rookery Bay area is about 24°C (75°F). Winter temperatures range from -1° C (ca. 30°F) to about 26°C (75°F), with cooler days and nights (10 to 15°C) in the months of January and February. Warming trends in April and May are frequently modified by blustery winds from the southwest off the Gulf of Mexico, and by late season cold fronts with northerly breezes. Summer high temperatures occasionally approach 35° C (95°F) or higher (Thomas 1974).

The Rookery Bay vicinity has an annual rainfall of 127 to 140 cm (50 to 55 inches) per year (Thomas 1974). The heaviest average monthly rainfall, 20 to 23 cm (8-9 inches) per month, occurs from June through September. Lowest average rainfall, 2 to 5 cm (1 to 2 inches) per month, occurs from November through March. Approximately 66 percent of the total yearly rainfall occurs between the months of June and October. Southwest Florida lies in the seasonal tropical weather belt that channels hurricanes toward or along the coast. Historically, the area is fortunate in that few severe hurricanes have come ashore.





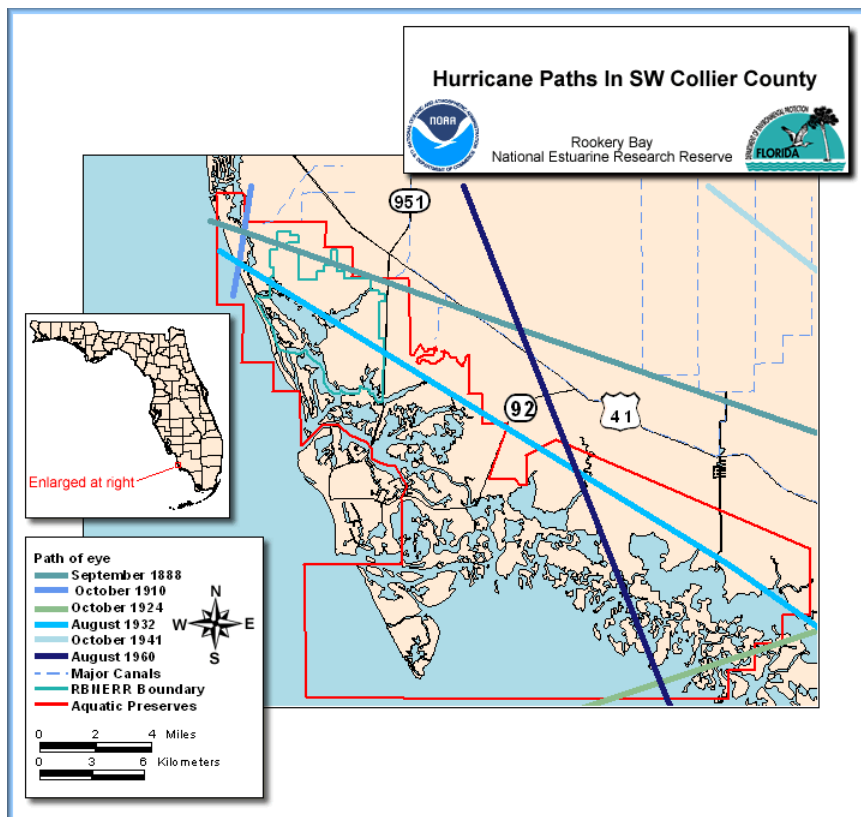
Natural Disturbances

Not all environmental impacts on Florida's estuaries are linked with humans and development. Natural forces, such as storms and ocean currents, have a tremendous influence on succession and beach location. Unlike the chronic influence of human activities, often with long lag-times between cause and effect, these natural disturbances are usually sudden, devastating, and far-reaching.

Several hurricanes have passed directly over, or very near, the Reserve and Aquatic Preserve. Many of these hurricanes occurred prior to the current naming practice, and before the capability to gauge the strength and size. Historical records indicate that mangrove forested wetlands in Rookery Bay were severely damaged as a result of hurricanes in 1918 and 1960. Donna, a Category 4 hurricane, passed directly over RBNERR in 1960, with the eye less than four miles from Henderson Creek. Andrew, a Category 5 hurricane, passed 35 miles south of RBNERR over the Ten Thousand Islands in 1992. Hurricanes of Categories 4 and 5 uproot mangroves and take the top off pine trees in a wide path of destruction.

While less dramatic than hurricanes, ocean currents, waves, and rising seas resulting from global warming, rearrange the shorelines and location of barrier islands with

changes visible in satellite imagery every few years. In many localities, groins, jetties, and beach nourishment are used in an attempt to maintain property lines. Within the Reserve and Aquatic Preserve boundaries, however, natural shoreline changes are monitored, but unmitigated.





The southwest coast of Florida is young in geologic terms, with current mangroves and uplands forming less than 5000 years ago. The earliest documented habitation by human is about 3500 years ago, but its history since then is rich and filled with evidence of a network of native American settlements and tales of outlaws and brave pioneers seeking refuge and commerce in hostile, unknown territories.

The first recorded non-native settlements in Rookery Bay and southwest Collier County began in the late 1880s. Growth was slow despite the construction of the Tamiami Trail connecting Naples to Miami in 1928. Naples, and the surrounding area, has changed from the slow-paced fishing village in the 1960s to the sprawling urban resort area of today, with one of the highest concentration of golf courses in the United States. Rookery Bay and its barrier islands were saved from development in the 1960s by the concerted efforts of local citizens concerned about dwindling natural coastal resources. In 1977, lands surrounding the bay that were purchased for conservation were accepted into the National Estuarine Research Reserve System.

Timeline

1964 Concerned citizens block "Road to Nowhere."

1965 The Collier County Conservancy is formed and \$300,000 raised to begin purchase of the Rookery Bay properties.

1967 The Conservancy purchased an additional \$150,000 of Rookery Bay property and deeded it to the National Audubon Society. They loaned money to buy one mile of beach near Wiggins Pass until the State could purchase it.

1968 Acquired entire western boundary of Rookery Bay for \$240,000 and received from the Collier families a gift of 390 acres of islands guarding south entrances.

1969 Purchased 2,000 acres in the Ten Thousand Islands area for \$245,000 and presented the land to the state for protection. Area designated as Cape Romano - Ten Thousand Islands Aquatic Preserve. Also bought 40 acres of land and buildings on Henderson Creek and used the purchase to establish a Marine Research Facility at Rookery Bay.

1971 Raised \$800,000 in eight weeks to pay for past and future land purchases. Acquired Shell Point for \$235,000, completely enclosing Rookery Bay.

1972 Continued making purchases around Rookery Bay.

1974 Obtained 258 more acres near Rookery Bay.

1975 Persuaded the state to buy a large portion of Cape Romano.

1976 Won a three-year battle to deny permits to Deltona Corporation which would have destroyed 3,200 acres of Marco wetlands.

1977 Completed work to get Rookery Bay declared National Estuarine Research Reserve.

1984 Orchestrated land exchange after 14 years of negotiations with Deltona. Deltona swapped 13,000 acres of wetlands and islands surrounding Marco for equally valuable uplands.

1988 Conservancy efforts led to acquisition of Cannon Island by the State of Florida.

2000 95 percent completion of CARL identified properties surrounding Rookery Bay National Estuarine Research Reserve. Effort underway to expand boundaries of RBBNERR to include the Cape-Romano - Ten Thousand Island Aquatic Preserves and all CARL, Florida Department of Environmental Protection, and Conservancy acquisitions

PRE-EUROPEAN

The earliest documented habitation sites in Rookery Bay date from about 2,500 years ago. These are presumed village sites, characterized by shell mounds, pottery, shell tools, and animal remains. These early inhabitants were hunters, fishers and gatherers. Deer and raccoon were frequently captured, and their bones were used to make tools. Fish were caught using lines and nets made from plant fibers. Shellfish, especially quahogs (huge clam like bivalves), whelks, conchs and oysters were important food and tool sources, and their abundance often determined where these people would settle for long periods of time.

Excavation of the Shell Island mound complex resulted in the conclusion that one of the mounds contained a single family residence built on piles. There were three occupations, or building phases, of this mound. Based on ceramics associated with these three occupations, the site dates from 500 AD to 900 AD. This date is important because it makes this site contemporary with the Key Marco site excavated in the late 19th century. Further, some of the ceramic design elements were found at both the Shell Island site and Key Marco, indicating a connection between the two sites located five miles apart.

THE SOUTHWEST FLORIDA FRONTIER

The colorful history of the Ten Thousand Islands and areas south of Ft. Meyers has been popularized through books such as *Killing Mister Watson* by Peter Matthiessen and *Ten Thousand Islands* by Randy Wayne White. These semi-fictional accounts provide a glimpse of southern Collier County as a refuge for outlaws and loners willing to deal with mosquitos and swamps and making a living off alligators, brightly colored bird plumage, sugarcane, tropical fruit, and fishing. Another local history has been written by long-term resident Totch Brown, entitled *Totch: A Life in the Everglades*.

A newspaper article from *The Naples News*, January 1, 2000, recounts the swearing in of Collier County's first sheriff in 1923. He made his new bride Chief Deputy and, despite a young child and the gender issues of the times, she gained respect for her ability to maintain order while her husband was in other areas of the county. As Barron Collier began his ambitious dredge, fill, and build program in the Everglades, bringing civilization to this last American frontier, the first sheriff was hired to fly the first aerial photography of Collier County. This produced the first landscape scale understanding of the flow ways and habitat patterns, and allowed the building of roads to upland areas suitable for development.



Preservation

In 1964, a group of Naples developers wanted approval from the Board of County Commissioners to extend Kelly Road across the intercoastal waterway and Rookery Bay area to islands and lands where they could build homes and condominiums. Outraged citizens dubbed the proposed road the “Road to Nowhere” and declared war. Key figures opposed to this road included Lester Norris, retired Texaco official and owner of Key Island; attorney George Vega; Charles Draper, retired Air Force Colonel; Joel Kuperberg, Naples City Councilman and botanist; Nelson Sanford, retired lumber executive; and Fred Winter, newspaper reporter. In the spring of 1964, attorney Vega appeared before the commission and unrolled a 50-foot petition down the middle of the board room and tacked the other end to the wall. “These are the people opposed to that road. Now, where are the people who want it?” The commission vetoed the road.

On April 11, 1964, the Collier County Conservancy and The Rookery Bay Committee were organized and charged with saving the estuary by buying the lands around it. Charles Draper, Lester Norris, and Herman Teetor donated the first \$2,500. Through private donations, a total of 2600 acres was purchased for the Rookery Bay Sanctuary. The state of Florida already owned and protected 1,400 acres of jurisdictional bay bottoms and wetlands in the Rookery Bay area. Together, the state’s ownership and Audubon’s stretched the boundaries of Rookery Bay sanctuary to 4,000 acres. In 1977, the National Audubon Society leased the reserve to the Florida Department of Natural Resources and a management committee was established, chaired by Audubon, the Collier County Conservancy and the state’s Natural Resources Department. Rookery Bay Sanctuary became Rookery Bay National Estuarine Research Reserve in 1978.

PRESERVATION OF ROOKERY BAY

Collier County was home to a scant 15,000 people in 1960...but things were about to change in a big way. Donna, a Category 4 hurricane, smacked into this piece of paradise on September 26, 1960, bringing devastation and publicity to the southwest coast of Florida. By the end of the decade, a housing boom, business boom, and a growth in tourism raised the area population to over 38,000!

Developers and real estate speculators understood the lure southwest Florida had on our neighbors to the north and a land scramble began. Miami-based Deltona Corporation began the transformation of Marco Island. Gulf American Corp. began an international sales pitch to

sell 113,000 acres of pine and cypress forests in the county's interior, now Golden Gate Estates. Gulf American dug 180 miles of canals and built 800 miles of roads through this forest land. Change had come indeed and to a group of concerned citizens, it was out of control.

This group of concerned citizens began asking questions about the canals being dug, the cutting of coastal mangroves, and the dredging of bay bottoms. They were told that growth was inevitable and their objections intensified. The straw that broke the camels back came when a group of Naples developers wanted approval from the Board of County Commissioners to extend Kelly Road across the intercoastal waterway and Rookery Bay area, to islands and lands where they could build homes and condos. Outraged citizens dubbed the proposed road the "Road to Nowhere" and declared war.

Key figures opposed to this road included Lester Norris, retired Texaco official and owner of Key Island; attorney George Vega; Charles Draper, retired Air Force Colonel; Joel Kuperberg, Naples City Councilman and botanist; Nelson Sanford, retired lumber executive; and Fred Winter, newspaper reporter. Others soon joined the group. Meeting at Norris' home on Key Island in 1964, the group decided to start a petition and bring the road issue to the voters.

Within weeks, the public outcry was "NO ROAD!" In the spring of 1964, the Board of County Commissioners considered the road. Attorney Vega appeared before the commission and unrolled a 50-foot petition down the middle of the board room and tacked the other end to the wall. "These are the people opposed to that road. Now, where are the people who want it?" The commission vetoed the road. Another attempt to revive the road a year later was also defeated.

The defeat of the "Road to Nowhere" dramatically shifted public sentiment toward the preservation of Collier County's natural resources. With this in mind, Norris and the others decided that the time was right to permanently preserve Rookery Bay by purchasing the lands surrounding it. A meeting was held at Norris' home on April 11, 1964. On that spring afternoon, the Collier County Conservancy was organized as an adjunct to the Nature Conservancy. The Rookery Bay Committee was organized that afternoon as well; the committee was charged with saving the estuary by buying the lands around it. Charles Draper, Lester Norris, and Herman Teetor donated \$2,500 to get the ball rolling.

In early 1988, a Naples developer announced plans to purchase and develop the northern end of Key Island. The Conservancy opposed this plan and launched a campaign. The Naples City Council voted 4 to 3 against development, but did allow the developer to go forward with 42 single-family homes. In 1993, 2,300 acres of Key Island became part of RBNERR.

Concerned with potential development on the Ten Thousand Islands, the Conservancy purchased 1,735 acres from the Alico Land Development Company in 1971. In the same year, the historic 70-acre Fakahatchee Island was donated to the Conservancy by the St. Charles Charities, a foundation established by Lester and Dellora Norris. The Conservancy also purchased the strategic Shell Point area next to the marine laboratory.

The 1970s ushered in a new environmental consciousness. Federal and state legislators passed a whole network of land-use and environmental laws designed to protect wetlands, coastal zones, and other critical natural areas.

On Feb. 10, 1971, the Conservancy began an unprecedented fundraising campaign—an appeal for \$600,000 to pay off its indebtedness and to finally purchase the last remaining parcels to close in the perimeter of Rookery Bay. Enter national celebrity and noted environmentalist Arthur Godfrey. Before a crowd of about 300 invited guests gathered in the Naples High School auditorium, Godfrey began the pitch. “I rarely get down in this neck of the woods, but if you name that big lake in the middle of new Rookery Bay tract ‘Nature Conservancy Bay’ I will give you \$50,000 for it.” Later that evening, at a reception for Godfrey at the Naples Beach Hotel, there occurred one of the most successful and strangest auctions in the history of the Conservancy. They auctioned off parts of Rookery Bay to the highest bidders. By May 1971, over \$600,000 had been raised.

In 1972, the Conservancy purchased parcels on Key Island to prevent development of platted lots. Key Island and the Conservancy would be in the news again in 1988.

In 1973, the Conservancy purchased the 40-acre Belvin tract on the northern perimeter of Rookery Bay. In 1974, they purchased another 80 acres and secured another 258 acres from the federal government by a no-coast lease, and persuaded the state to buy a large portion of Cape Romano. By 1975, Rookery Bay Sanctuary had grown to 4,900 acres and the move was on to transform Rookery Bay into a National Estuarine Research Reserve. Rookery Bay would become a national estuarine research reserve in 1978.

In 1977, the National Audubon Society leased the reserve to the Florida Department of Natural Resources and a management committee was established, chaired by the National Audubon Society, the Collier County Conservancy, and the Department of Natural Resources

The 1980s saw the state dedicate its new headquarters at the Rookery Bay National Estuarine Research Reserve (RBNERR). By this time, the state had acquired about 3,000 acres, bringing the reserve to 9,000 acres. In April 1982, the Conservancy unveiled its new Briggs Nature Center and boardwalk, located in RBNERR.

On March 25, 1984, following a 20-year battle, the state and Deltona Corporation entered a land agreement that netted the state 13,000 acres of wetlands in the Marco Island area. In 1985, the Conservancy’s Environmental Protection Division began a petition drive to save five barrier islands: Cannon, Johnson, Coconut, Key, and Little Marco. These islands front RBNERR and the Conservancy wanted them placed on the state’s Conservation and Recreation Lands (CARL) list of possible purchases. The effort paid off. On November 8, 1985, the state placed the islands and additional wetlands on the CARL list. The total purchase was 3,800 acres. The state bought Cannon Island in 1988.

RBNERR PARTNERS

Florida Department of Environmental Protection

The Florida Department of Environmental Protection (FDEP) has 18 divisions concerned with safeguarding Florida's environmental resources including Coastal and Aquatic Managed Areas (CAMA). RBNERR is managed by CAMA, in partnership with the National Oceanic and Atmospheric Administration (NOAA). FDEP is headquartered in Tallahassee, Florida, with field offices throughout the state. The director of RBNERR is also responsible for management of four other aquatic preserves - Tampa Bay, Charlotte Harbor, Estero Bay, and Cape Romano- Ten Thousand Islands Aquatic Preserves. For more information, visit the FDEP homepage: <http://dep.state.fl.us>

The Conservancy

In 1964, the Collier County Conservancy, now the Conservancy of Southwest Florida, the Nature Conservancy, and the National Audubon Society played a large role in preserving the initial 3,000 acres of what would later become Rookery Bay National Estuarine Research Reserve. Today, the Conservancy of Southwest Florida still has a presence within the Reserve through the Briggs Nature Center, an interpretive and educational center that is located on Rookery Bay National Estuarine Research Reserve's managed lands. Funded by children and grandchildren of the late Stephen F. Briggs, a noted philanthropist and nature-lover, construction and dedication of the center was completed in 1982. In their commitment to educate and inform the public of the importance of our environment and its conservation, the Briggs Nature Center offers a 0.5-mile boardwalk through six different communities found within the Reserve. Additionally, the interpretive center offers a butterfly garden, a canoe path, and guided boat and canoe trips for visitors to explore and enjoy. For more information, visit : <http://www.conservancy.org>

National Estuarine Research Reserve System

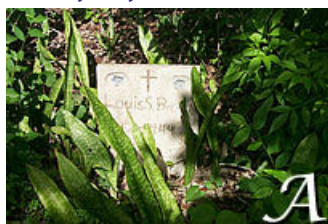
Rookery Bay National Estuarine Research Reserve is one of 25 Reserve sites in the U.S.A. This program is a partnership between NOAA and state agencies in almost every coastal state in America. The mission of the National Estuarine Research Reserve (NERR) system is to conduct and facilitate scientific research and monitoring to address significant coastal management issues. NERRS was established by Congress in 1972 through the Coastal Zone Management Act.

NOAA's Coastal Service Center was started in 1994 to provide technical, information, and management support to a broad range of state and federal agencies working on coastal issues. This ecological characterization is a joint project developed by the Center and RBNERR. The Center provided GIS, aerial imagery, and HTML expertise as support for spatial modeling, research, and field verification conducted by RBNERR staff. For more information, visit : <http://www.ocrm.nos.noaa.gov/nerr>

Friends of Rookery Bay

Established in 1987, the Friends of Rookery Bay has taken a leadership role in ensuring that Rookery Bay National Estuarine Research Reserve continues to serve as an outdoor laboratory for visiting investigators from around the world, an outdoor classroom for thousands of students from around the United States; and a natural, historical, and cultural coastal asset for residents and visitors.

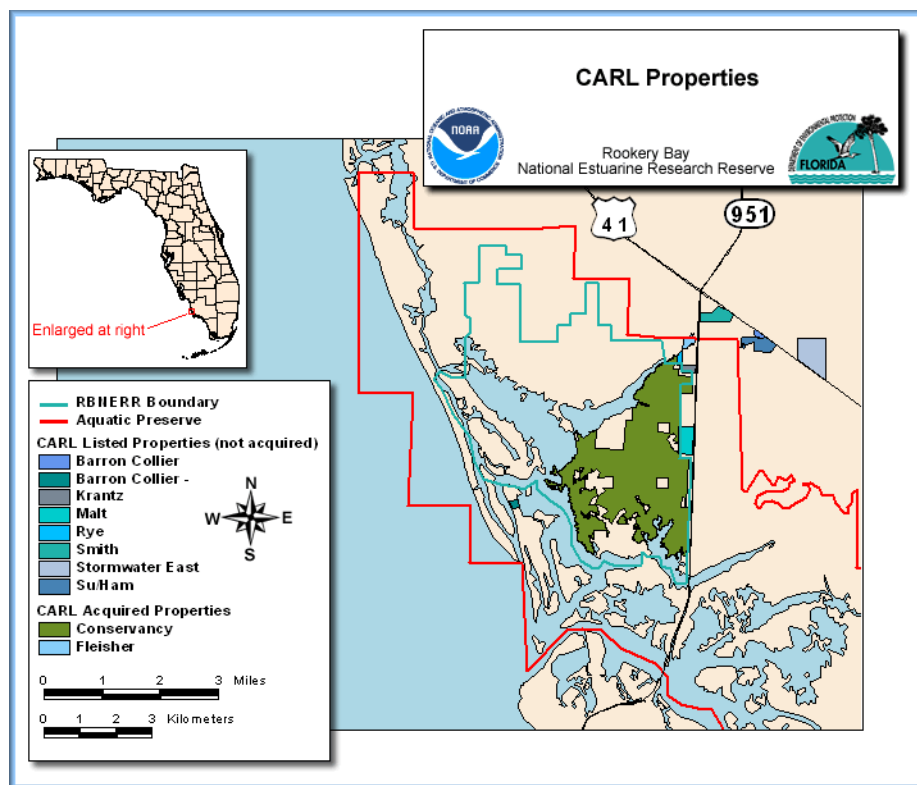
The Friends of Rookery Bay organization provides the support needed to maintain high-quality, on-site, estuarine education programs. It also sponsors off-site programs designed to address priority issues including increased demands on coastal resources generated from unprecedented urban development in the area. A well-informed public is better equipped to make sound decisions about the problems and issues facing the estuarine environment. Friends of Rookery Bay, Incorporated, is a registered 501-(c)-3 non-profit citizen support organization that aids RBNERR through tax-deductible donations. For more information, visit : <http://www.rookerybay.org/forb>

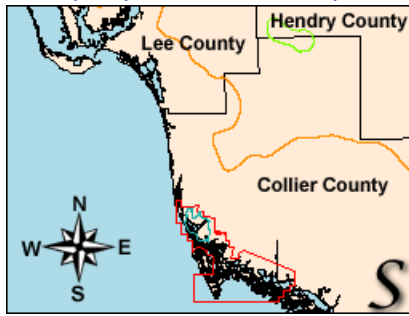


Archeology

The oldest dated formation found in western Collier County shows that this part of the Florida peninsula formed in the late Miocene era, or about 5.7 to 9.5 million years ago. This unnamed formation lies under the Tamiami Formation, which is the current aquifer for western Collier County, and was formed sometime during the Pliocene Era. During the Pleistocene Era, sea levels fluctuated with glacial activity. Terraces were formed across the Florida Peninsula at different elevations, and relic sand dunes can be found today along these ridges. The two terraces in the Rookery Bay area were the Silver Bluff terrace at 1 to 10 feet above current sea level and the Pamlico terrace varying between 18 and 25 feet.

Approximately 5,000 years ago, the current environmental conditions were reached in Florida, making it possible for human populations to occupy almost every part of Florida. In Rookery Bay, the mangrove and coastal estuaries had also been formed. In 1995, archeologists with the Florida Bureau of Archeological Research conducted a reconnaissance of approximately 12,000 acres of CARL Project lands within the Reserve. They recorded 20 sites: 11 pre-European and 9 from the late 19th and early 20th century homesteads. The earliest documented habitation sites in Rookery Bay date from about 2,500 years ago, with skeletal remains dating to 3,000 years ago.





Sea Levels

During the Pleistocene era, much of Florida was under water. Several different long-term sea rises left remnants of shorelines at seven different levels within that era, and are now referred to as terraces. The two lowest levels, Talbot and Pamlico, are evident in Collier County. These sea levels were estimated to be 25 to 42 feet above sea level in mid-20th century for the Talbot terrace and 20 to 25 feet above sea level for the Pamlico (Wanless *et al.* 1994, Scholl 1964, McCoy 1962).

Using current topographical information for Collier County, an estimated shoreline for these terraces can be illustrated using GIS. The 5-meter elevation contour is used to represent the Pamlico terrace. This elevation may also match the searise 3200 YBP (Wanless *et al.* 1994), when most of the southwest Florida coastline was again temporarily inundated. The 10-meter contour is used to represent the Talbot terrace. This means that all of Collier County, except for a small island near present day Immokalee, was under water for most of the Pleistocene era.

There are several periods in geologic history when the shoreline was much further out on the Gulf of Mexico shelf (Wanless *et al.* 1994), but current bathymetry maps covering areas far enough out to illustrate this level are not available.

Because of the relatively rapid change in sea levels throughout the period from 15,000 YBP to 3200 YBP, no significant marine ridges were formed, and coastal lagoons and estuaries were ephemeral and narrow bands of vegetation. The rate of advance and retreat has slowed from a high of about 2 meters per year (9000 YBP) to the current rate of 30 cm per 100 years. While mangrove forests and marl levees provide stability and slow changes to the shoreline during these rises, barrier islands such as Keewaydin experience highly variable changes in shoreline due to currents and wave action.

Changing shorelines impact human property. Clockwise starting at upper right: house originally located several feet inland from the shoreline; southwest corner of Cape Romano showing location of both houses pictured here; a complex of domes leaning towards the Gulf after shifting sands eroded foundation.



PRE-EUROPEAN

The earliest documented habitation sites in Rookery Bay date from about 2,500 years ago. These are presumed village sites, characterized by shell mounds, pottery, shell tools, and animal remains. These early inhabitants were hunters, fishers and gatherers. Deer and raccoon were frequently captured, and their bones were used to make tools. Fish were caught using lines and nets made from plant fibers. Shellfish, especially quahogs (huge clam like bivalves), whelks, conchs and oysters were important food and tool sources, and their abundance often determined where these people would settle for long periods of time.

Excavation of the Shell Island mound complex resulted in the conclusion that one of the mounds contained a single family residence built on piles. There were three occupations, or building phases, of this mound. Based on ceramics associated with these three occupations, the site dates from 500 AD to 900 AD. This date is important because it makes this site contemporary with the Key Marco site excavated in the late 19th century. Further, some of the ceramic design elements were found at both the Shell Island site and Key Marco, indicating a connection between the two sites located five miles apart.

POST EUROPEAN

Controlled recovery of archeological remains at the nine pioneer homesteads in the Reserve area was completed in June 1996. Of these nine sites, six contained significant archeological material warranting further investigation. These historic sites have national significance as they represent the settlement of a little known region during the period of growth following the Civil War. While most other regions had developed towns and improved transportation by the end of the 19th century, southwest Florida was largely unexplored.

In 1842, the Armed Occupation Act offered lands to settlers in areas recently taken from Native Americans. A complete list of settlers who claimed land under the act shows that no one claimed land in the Rookery Bay area. In 1866, the Bureau of Refugees, Freedmen, and Abandoned Lands created the Homestead Act, under which ex-slaves were given land. Until 1876, land grants were limited to 80 acres and restricted to free slaves and immigrants. It was not until this Homestead Act was revised in 1885, opening the offer to all, that pioneers began to settle in the Rookery Bay area, building permanent residences on Henderson Creek.



Socio-Economics

Rookery Bay NERR is located in Collier County, one of the fastest growing counties in the United States. Collier County is also home to a portion of the original Everglades water flow way and many other environmentally sensitive lands, such as mangroves. Over half of the county is in public ownership, managed by either state or federal agencies. These opposing land uses—rampant development and large conservation areas—create unique problems and opportunities for the Reserve. RBNERR staff work closely with private developers, regional planners, and the water management district to encourage plans that protect freshwater flows to the estuary and maintain important wildlife corridors, while meeting the needs of a growing population.

Agriculture, tourism, fishing, boating and commercial crabbing are other important revenue sources in Collier County, and the undeveloped areas of the Reserve and the Aquatic Preserve are heavily used year-round. Acquisition and restoration of watershed and barrier island land surrounding the Reserve is a high priority as a means of buffering the estuary from developmental pressure. However, once the land is in public ownership, conflicts over public access and recreational use arise. Balancing the need for estuary research, preserving rare habitats and educating the public through strategic access is a never ending management task.

State / County Environmental Legislation

All of Florida's statutes are available on-line:

<http://www.leg.state.fl.us/statutes/index.cfm>.

Those related to natural resource use, protection and conservation are listed under Title XXVIII: Natural Resources: Conservation, Reclamation and Use.

Please remember that if you are visiting any reserve, preserve or refuge in the state of Florida, it is illegal to remove any samples of any kind without first acquiring a sampling permit through the Florida Department of Environmental Protection.

Information about county legislation can be found at

<http://www.co.collier.fl.us> or <http://colliergov.net>.



Collier County currently ranks among the highest in Florida's metropolitan growth rates and is considered one of the fastest growing areas in the nation. Between 1980 and 1998, County population increased 144 percent from 85,971 to an estimated 210,100. The county's population is projected to reach 289,500 by 2010, representing an increase of 38 percent over the population in 1998. By 2020, the population is projected to exceed 358,000 people.

During the winter season, an estimated 750,000 tourists and seasonal residents visit the area each year, adding to the population. This kind of rapid growth puts enormous pressure on environmental resources in any locality. In an area that historically was under several inches of water for three to six months out of the year, this kind of growth implies severe ecological impacts in the form of dredge and fill for housing; saltwater intrusion in and drawdown of aquifers from increased water consumption and drainage canals; and increased runoff of nutrients, sediment, and contaminants to and increased public use of sensitive estuaries.

Data presented in this section is not a complete picture of growth in the area. Several studies exist providing detailed demographic information for Collier County.

Property Values

The appraised value for developed parcels in some of the sections surrounding The Reserve and the Aquatic Preserves are shown in this map. Total value for each section was determined from county tax information. The value per acre of developed land was determined by dividing the total value per section by the acreage of developed land within each section, determined from aerial photography and groundtruthing.

There are too many confounding factors—waterfront, proximity to amenities, and stage of development, for example—to draw conclusions about values adjacent to natural areas. This map does give an idea of overall land value for the Reserve area, and can be compared to values in inland areas or east coast values for land use planning information.



Economic Valuations

Costs associated with typical goods and services are relatively easy to calculate. Property values are dependent upon a complex mix of location, amenities and aesthetics, but are largely determined by square footage and quality of building materials. The price of raw materials is determined by the labor and machinery required for extraction. All these factors—wages, overhead, capital costs, and transport—fluctuate with the strength of the currency and supply and demand, but they are well established in a monetary framework that fixes a dollar value on consumer products and information.

Naples, the Collier County seat, is known for its mild climate, tropical beauty, and waterfront location. This combination makes for high property values and creates a highly desirable area for living. Ironically, this attraction to the environment may inevitably lead to destruction of the services valued most in western Collier County—clean, clear water with abundant wildlife, fish, and lush vegetation.

Environmental attributes are not traded commodities, and even though many county residents' livelihoods are dependent upon the environment, Is it the cost to restore or replace the structure and function of a mangrove or saltmarsh? Is it the cost of the sand and gravel required to filter water and recharge the aquifer? How much is the willingness to pay for aesthetics or recreation worth? Can we determine the value of an estuary by the future fish crop it will provide? Or will the value be determined in the future when natural resource supply is scarce and demand is high?

The most comprehensive economic valuation to date of ecosystem services and functions of estuaries and other natural systems estimate that a hectare of mangroves provides \$9,990 per year in service, seagrasses provide \$19,004 per year, estuaries and bays deliver \$22,832 per year, and coastal waters offer \$4,052 per year (Costanza *et al.* 1997). These values are based on a synthesis of non-market valuation techniques, including willingness-to-pay, costs of human-made, substitutable goods, and previous estimates of natural capital, translated into 1994 dollars.

Based on these values and acreage for each system within the Rookery Bay Reserve and Aquatic Preserves, the Reserve provides approximately \$407,250,000 in environmental services to Collier County and the State of Florida every year. This is more than ten times the estimated tourist revenue of \$35,282,000 during the 1993-1994 fiscal year (derived from tourism development taxes in Collier County, Pierce 1995).



Land Use Planning

Projections by the Collier County government anticipate continued rapid growth in the next five years, particularly along the State Road 951 corridor, and south of U.S. 41 (Tamiami Trail). These areas are designated as urban and directly adjoin the eastern and northern boundaries of the Reserve. The Collier County Comprehensive Plan presents criteria for development of county lands and provides a map with recommendations for land use.

Land to the northwest, south, and west of the Reserve is designated as Coastal Resource Management/Recreation, and is restricted for large scale development. Smaller projects, including Planned Unit Developments (PUD's) may be permitted. The Florida Department of Community Affairs (DCA) has designated portions of Collier County, including the Big Cypress National Preserve and Fakahatchee Strand State Preserve as an Area of Critical State Concern (ACSC). Under the ACSC program, DCA reviews any development order for construction as defined by Florida Statutes, Chapter 380.04 for consistency.

SOUTHWEST FLORIDA REGIONAL PLANNING COUNCIL

Comprehensive long range land use plans are required by the State of Florida. These are completed at two different scales - regional and county by county. For maps and other information at the regional level, visit this website:

<http://www.swfrpc.org>

COLLIER COUNTY PLANNING For maps and information about Collier County's future land use plans, environmental resources and demographics, visit this website:

<http://www.co.collier.fl.us/planning/compplanhome.htm>

For more complete information links, visit the Collier County Government home page:

<http://www.co.collier.fl.us>



Conservation

The Rookery Bay Reserve is located in Collier County, the second largest county in the state, covering approximately 2,025 square miles of land. Over half of this area has been set aside under public or private ownership for conservation purposes, with the Reserve designated as one of ten large conservation areas.

NOAA program regulations state that a National Estuarine Research Reserve's boundaries "encompass an adequate portion of the key land and water areas of the natural system to approximate an ecological unit and to ensure effective conservation." In 1985, the Department of Natural Resources and CSF developed a land acquisition project boundary to purchase and incorporate privately-owned lands from willing sellers adjacent to the Reserve. The state's Conservation and Recreation Lands (CARL) Selection Committee approved the project boundary, enabling these lands to be eligible for purchase using CARL funds. The CARL project boundary was modified in 1995 to include additional parcels along Henderson Creek. The project's stated purpose is to protect the Reserve's water quality, preserve habitat for native plants and animals, and to provide recreational opportunities to local communities in southwest Florida. Significant state funding was provided through Preservation 2000, enacted by the Florida legislature in 1990 to provide bond revenues to purchase environmentally sensitive lands. Additional federal funds were provided by NOAA and the U.S. Fish and Wildlife Service (USFWS). This important partnership effort represents an investment of approximately \$57 million in CARL funds used to purchase and preserve essential lands for the Reserve.

FLORIDA FOREVER ACT (6/7/99)

On June 7, 1999, Governor Jeb Bush signed the Florida Forever Act at Little Talbot State Park in Jacksonville, Florida. The bill succeeds the Preservation 2000 bill, and allows the state to acquire and improve environmental recreational lands and water areas. Three billion dollars have been committed to allow the state to restore and develop Florida's water resources. Through a bond program, the state expects to receive \$300 million each year through the year 2010.

PRESERVATION 2000

As a result of Florida's continued growth (approximately 4 percent increase annually), former Governor Bob Martinez created a "blue ribbon commission" in 1990 to evaluate the environmental status of the state. The commission's report warned that at the 1990 rate the state would lose some 3 million acres of wetlands and forests to "other uses" by the year 2020, destroying much of Florida's vital freshwater recharge areas as well as its unique ecological diversity (including many of the state's 548 endangered and threatened species).

Statewide polls concluded 88 percent of Floridians felt the government should give more attention to the state's environmental problems and 63 percent were in favor of spending more money on the environment. The report concluded there was "strong statewide public support of an expanded land acquisition program". Governor Martinez responded with a proposed \$3 billion land preservation fund to be distributed annually over the next 10 years. This became "the most ambitious land acquisition program in the United States", creating Preservation 2000 (P2000).

The P2000 program has successfully preserved more than 900,000 acres of sensitive lands within 60 counties; therefore, ensuring the preservation of Florida's biological heritage for future generations to enjoy. Many local governments have matched state funds in order to achieve their conservation goals.



Public Access

Primary public use of RBNERR resources has traditionally been boating and fishing, but with rapidly growing population and tourism, all uses of RBNERR have increased with carrying capacity surpassed in some areas. Initial steps taken by the Reserve to promote compatible public use included the construction of trails and boardwalks, installation of informational signage, and conducting workshops for the general community and targeted users. Despite these efforts, incompatible public use resulting in destruction or degradation of natural resources is increasing within the Reserve.

Staff at the Reserve have observed poaching of deer and other wildlife; theft of signs and equipment; camping and fires in prohibited areas; illegally cut mangroves; construction of illegal structures; impacts to sea grasses from boats in shallow waters; deliberate flushing of nesting birds from protected rookeries; a significant increase in manatee mortality from boating impacts; more frequent overnight anchorages contributing to degraded water quality and impacts to submerged resources from anchoring; and off-road vehicle use in sensitive upland/wetland areas causing rutting, long-term loss of vegetation, and sheetflow disturbances.

Through a community-based planning process, the Reserve is developing public access and visitor use projects that promote uses of Reserve resources that are compatible with the mission of RBNERR, ensures protection of key natural and cultural resources, and keeps pace with the changing needs of local communities. Using existing authority provided by local, state, and federal laws, appropriate policies will be established for public access and visitor use that ensure protection of important natural and cultural resources, working cooperatively with partner agencies and law enforcement to provide policy enforcement. Visitor outreach efforts will convey use policies and the need for them, and visitor use will be monitored to assess impacts to environmental conditions within the Reserve.

PUBLIC USE POLICIES

RBNERR has established the following policies to guide compatible public use of Reserve resources. These policies are based on existing local, state, and federal rules and regulations. The Reserve will coordinate enforcement of these policies with adjacent managing agencies, such as the Division of Recreation and Parks (Florida Department of Environmental Protection), U.S. Fish and Wildlife Service, and National Park Service, as appropriate. RBNERR public use policies are as follows:

Public use and enjoyment of RBNERR resources is encouraged, provided that such activities are in compliance with local, state and federal laws; do not interfere with or otherwise impact Reserve research, stewardship, and education projects; and do not conflict with protection and preservation of Reserve natural resources. This policy promotes and encourages traditional recreational low-impact uses including, but not limited to, bird-watching, nature photography, hiking, canoeing, and kayaking. Hiking is only permitted in designated areas.

Boating and Fishing: Recreational fishing and shellfishing, commercial fishing, and power boating are allowed in Reserve waters, as long as such activity is in compliance with existing local, state, and federal laws. Prop dredging by watercraft in shallow water habitats, which damages essential submerged resources such as seagrass habitat, is not allowed. Speed limits outside of marked channels is 20 mph, unless otherwise indicated in the state-approved Collier County Manatee Protection Plan.

Resource Removal and Introduction: Visitors are not allowed to remove, damage, or introduce any live animals or plants (with the exception of fish and shellfish as described above), or any physical components from or to the Reserve unless it is part of an approved RBNERR research, stewardship or education project. Researchers engaged in collecting activities must also have appropriate permits from FWC. Shell collecting is allowed, but collection of live shells is prohibited with the exception of recreation or commercial harvest as approved by state law (see above).

Pets: Resident staff (including visiting investigators, faculty, and students staff from state agencies, the Nature Conservancy, and National Audubon Society) are not allowed to keep pets at the Reserve. Leashed or controlled dogs, used for security purposes or for compliance with the American Disabilities Act (ADA), may be allowed with written permission of the Reserve manager. Due to the potential for conflicts with wildlife, visitors to the Reserve must keep all pets on a leash or under control at all times. Results of wildlife monitoring may indicate the need for designated areas where dogs must be leashed, or areas where pets are not allowed.

Camping and Fires: Camping and campfires are allowed in designated areas only within the Reserve, including traditionally used sites on Key Island, Coconut Island, Gullivan Key, White Horse Key, Hog Key, and Cape Romano. Campfires may be prohibited during high fire hazard periods. Camping and campfires at non-designated sites are prohibited. Exceptions to this policy, for approved research and education projects requiring such use, may be authorized with written permission from the Reserve manager as appropriate. If results of site monitoring indicate significant impacts from camping and/or fires, the Reserve may initiate a permitting system to reduce threat to resources. Updated maps indicating designated camping areas within the Reserve, and "Leave No Trace" guidelines, are available from the Reserve headquarters.

Hunting and Firearms: Hunting and the use or possession of firearms and traps is prohibited within the Reserve, with the exception of RBNERR-approved nuisance/ exotic animal control or research projects in support of land stewardship goals, and law enforcement.

Off-road vehicles (ORVs): ORVs are not allowed in off-road sites within uplands or wetlands of the Reserve, with the exception of law enforcement, Reserve management, research, and emergency vehicles, such as fire and rescue vehicles.

Speed Limits: Posted maximum speed limits on Shell Island Road are 25 mph, and 15 mph at the boat ramp and CSF Briggs Center.

Wildlife Viewing and Protected Species: Visitors are allowed to approach wildlife only if their presence causes no disturbance to wildlife. Harassment of wildlife (that is, any activity that disrupts the normal behavior of the animal) is prohibited. The West Indian manatee or any other protected species within the Reserve shall not be harassed, injured, or killed. Feeding wildlife, such as alligators or dolphins, is dangerous and is considered harassment.

Site and Trail Closures: Results of monitoring and research may indicate the need to close specific components of the Reserve to public access periodically, seasonally, or year-round.

Public access to private and leased land will be maintained. Trespassing is prohibited in posted areas. Examples of closure areas which may be posted include, but are not limited to: wetland restoration sites and damaged areas, scrub research sites, critical nesting areas for wading birds and shorebirds, and sites that have been historically used as illegal dumping grounds. Trails will be temporarily closed to allow for maintenance and repair of facilities and signs, and to periodically allow for recovery of natural resources at heavily used sites. Results of research or community planning forums may indicate the future need to establish zones within the Reserve that are appropriate for visitor activities such as water-related recreation (for example, personal watercraft or water-skiing) as well as areas where such activities may be limited to ensure long-term protection of manatees, sea grass habitats, or other natural resources of critical value within the Reserve.

Littering: Visitors are not allowed to litter or leave any trash in the Reserve, including yard trimmings and vegetation.

Independent Projects: Projects outside the scope of Reserve management, conducted in the Reserve by individuals or agencies must be coordinated through the Reserve manager or designee before implementation. Examples of projects include, but are not limited to: research or restoration by local, state, and federal agencies; private organizations; and individuals.

Aquaculture: Any proposed aquaculture or mariculture projects in the Reserve that may result in the degradation of baseline environmental conditions and loss of natural scenic values constitutes an activity that is not compatible with the Reserve's goal of resource protection. As such, proposed projects of this type will be restricted.

Archeological Resources: Proposals for conducting archaeological surveys and studies at historical resources sites within the Reserve are encouraged, and will be coordinated with the Reserve manager and the Florida Division of Historical Resources.

Water Quality: The State of Florida has designated waters within the Reserve as Outstanding Florida Waters (OFW), providing for the state's highest level of protection. Any activity that degrades ambient water quality conditions within an OFW is prohibited.

Commercial Activities and Private or Public Events: The sale of food or other goods and services (for example, rental of boats and personal watercraft) on state-owned public lands within the Reserve is prohibited, unless part of an approved DEP RBNERR community event. Private functions, such as parties or weddings, on state-owned public lands within the Reserve are prohibited. Public events planned within the Reserve must have prior written authorization of the Reserve manager to ensure minimal impact on wildlife and resources. The sale of goods and services, as well as private events are permitted at the CSF Briggs Center.

Critical Wildlife Areas and Seasonal Shorebird Nesting Grounds: The Reserve, National Audubon Society, and FWC have cooperatively established Critical Wildlife Areas (CWA) for important wading bird rookeries in the ABC Islands located adjacent to Marco Island, and Rookery Island in Rookery Bay. When posted, boaters are prohibited from approaching the islands beyond the sign boundary to ensure protection of nesting and resting birds. RBNERR, NAS, and FWC will also continue to mark important shorebird nesting grounds on Key Island, Cape Romano, and adjacent shoaling islands in the Ten Thousand Islands on a seasonal basis to protect shorebird nests. Boaters and beach users must avoid entering beyond the sign boundary.

Overnight Anchorages: Boaters are allowed to anchor overnight in designated anchorages for up to two nights. All vessels must be in compliance with applicable local, state, and federal rules regulating marine pollution and sewage discharge. All wastes must be kept onboard until they can be properly disposed of in approved marina pump-out facilities. Boaters are strongly encouraged to anchor in non-vegetated sand bottom to reduce impact to seagrass beds and other submerged resources. Permanent or long-term (beyond two days) anchoring is prohibited within the Reserve, unless part of a research project approved by the Reserve.

CORE OBJECTIVES

Design and construct the Environmental Learning Center (ELC) including boardwalk and trails, providing visitor services to help meet increasing needs of the community.

Continue patrols of public access areas

The Reserve will use trained volunteers to provide additional public information and non-law enforcement patrol of Reserve waters.

The Reserve will periodically host community workshops and forums to gather input from local residents and user interests on the design and placement of trails and signs, related public access issues, and needs. The Reserve will use a modified version of the Visitor Experience and Resource Protection framework developed by the National Park Service to address visitor use and carrying capacity issues, that provides for direct community involvement in planning for visitor management.

The Reserve will conduct periodic aerial flights to monitor public use in remote areas of the Reserve.

The Reserve will continue to conduct monthly boater use surveys to track trends in boater use patterns. The surveys have been incorporated into the Reserve's Geographic Information System (GIS) to assist resource monitoring efforts since 1996.

The Reserve will design and develop public information signs, providing interpretation on barrier islands and other sites, promoting coastal stewardship, for installation at intensively used sites. The Reserve will design and install boater information signs, and distribute outreach materials in cooperation with Collier County, the City of Marco Island and other partners, at local boat ramps and marinas to promote conservation and protection of Reserve resources.

The Reserve will host a series of training workshops for marine law enforcement officers with FWC, Department of Environmental Protection, U.S. Fish and Wildlife Service, Collier County, City of Marco Island, CSF, and others as part of the Coastal Institute program.

To address ongoing environmental, security and public safety concerns at Shell Island Road related to intensifying public use, the Reserve will pursue the following options: increased patrol by local law enforcement officials; increased use of public information signs; establishment of a managed boat ramp area in cooperation with the CSF (current landowner of the ramp site).

Designate a formal easement on Shell Island Road recognizing the responsibilities of the state and Collier County in maintenance and protection of facilities and natural resources. The state will pursue the feasibility of installation of a gate at the entrance to the road.

Protect bird rookeries.

Conduct a visitor use study and survey for the Reserve.

Maintain trails.



Trails and Access Points

The Reserve, in cooperation with the Conservancy of Southwest Florida and many local community partners, has developed a trail system to provide for public access and interpretation of unique natural and cultural resources within the Reserve. Trails are designed to introduce the visitor and student to representative native plant communities ranging from mangrove forested wetlands, to important upland buffer lands such as pine flatwoods and oak scrub habitats. In addition, the Reserve's trails provide an excellent opportunity to learn about ongoing restoration projects, prescribed fire regimes, wildlife and protected species, and historical cultural resources of the Reserve. The Reserve's trail system includes both aquatic and terrestrial trails, providing the visitor with opportunities to experience the estuarine and coastal environment via canoe or kayak. Designated access points within the Reserve provide increasingly utilized sites for public use and enjoyment of the Reserve's coastal environment.

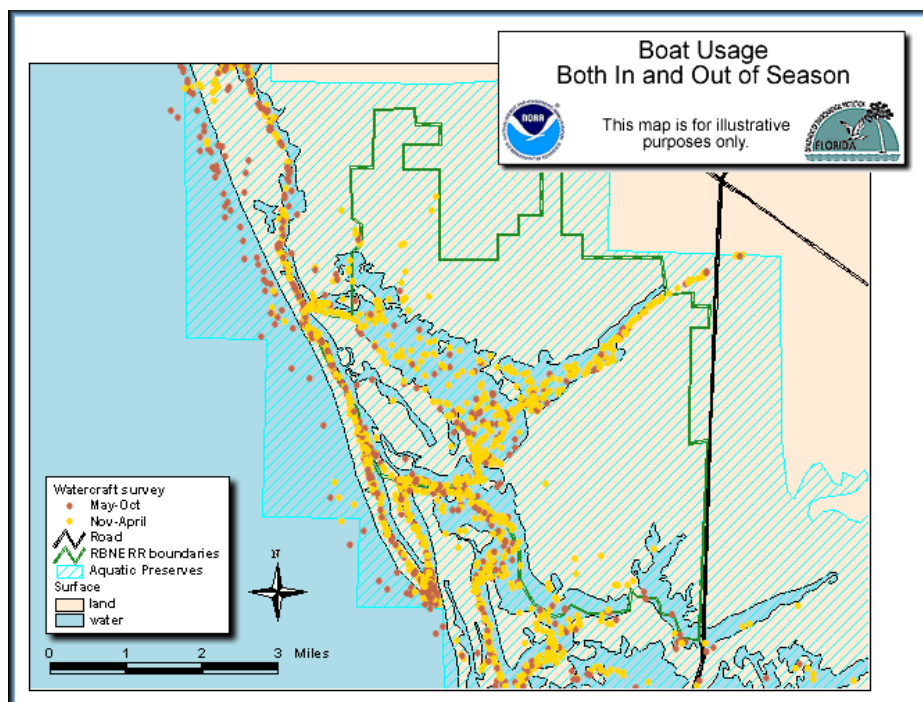




Recreation

While the Reserve provides important opportunities for compatible recreational use such as hiking, boating and fishing, the intensity of public use and the frequency of incompatible public use is increasing as resident and tourist populations in Collier County continue to increase at an unprecedented rate. Along with an increase in population, boating registrations in Collier County have increased dramatically since 1986, with a total of 18,240 registered boaters in 1998. Reserve staff have observed a significant increase in use of recreational boats, including personal watercraft, within the Reserve since 1990. This trend is expected to continue as the population increases. Boating can result in impacts to wildlife and other natural resources, such as the West Indian manatee and wading bird rookeries.

Each year during the winter season, approximately 750,000 tourists and seasonal residents visit the area. However, a 5-year RBNERR boating survey shows a long-term average difference of only 19 percent between seasonal and non-seasonal use of Reserve waters.





Rookery Bay Boundary Expansion

In 2000, DEP, supported by the Reserve Management Board, proposed that the original RBNERR boundary be expanded to incorporate adjacent state-owned coastal lands. In January 2003, the Reserve's expanded boundary was officially recognized by NOAA. The expanded boundary includes all the area currently managed by the Rookery Bay NERR staff as designated by the State of Florida Board of Trustees. The Reserve boundary now encompasses approximately 110,000 acres and represents an estuarine system extending from Gordon Pass to the north and all state-owned uplands and submerged lands within the Ten Thousand Islands region to the south. The DEP, supported by the Reserve Management Board, recommended this action to:

- o Enable the Reserve to direct resources and associated federal funds to support active research, stewardship, and education programs for state-owned lands adjacent to Rookery Bay that represent a larger contiguous estuarine ecosystem.
- o Provide a larger, more diverse estuarine ecosystem that is more representative of the West Indian Biogeographic Region.
- o Designate adjacent coastal wetlands and islands, including the Ten Thousand Islands, as an estuary of natural significance.

DEP signed a lease agreement in 1990 with the Board of Trustees that provides management authority for all uplands identified in the proposed NERRS expansion. Title and authority for submerged lands management within the proposed boundary is provided for in Chapter 258 (F.S.). All lands located within RBNERR and the boundary expansion are essential components of a contiguous estuarine ecosystem, and will not be considered as surplus under current and planned management strategies.

Because the ecological characterization project was substantially complete prior to the official boundary expansions, most of the maps produced in support of this project represent the pre-expansion boundary.

